

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 October 2002 (31.10.2002)

PCT

(10) International Publication Number
WO 02/087194 A1

(51) International Patent Classification⁷: H04L 29/08, (74) Agent: PAGE WHITE & FARRER; 54 Doughty Street, G06F 17/30 London WC1N 2LS (GB).

(21) International Application Number: PCT/IB02/02172

(22) International Filing Date: 12 April 2002 (12.04.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0109823.5 20 April 2001 (20.04.2001) GB

(71) Applicant (*for all designated States except US*): NOKIA CORPORATION [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): JENSEN, Joe [DK/DK]; Storkevej 25, 1, DK-7741 Frostrup (DK). ASTON DIVE, Robert [GB/GB]; 32A Wordsworth Road, West Sussex BN11 3NJ (GB). THE, Dao, Van [DK/DK]; Hobrovej 358, DK-9200 Aalborg SV (DK).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

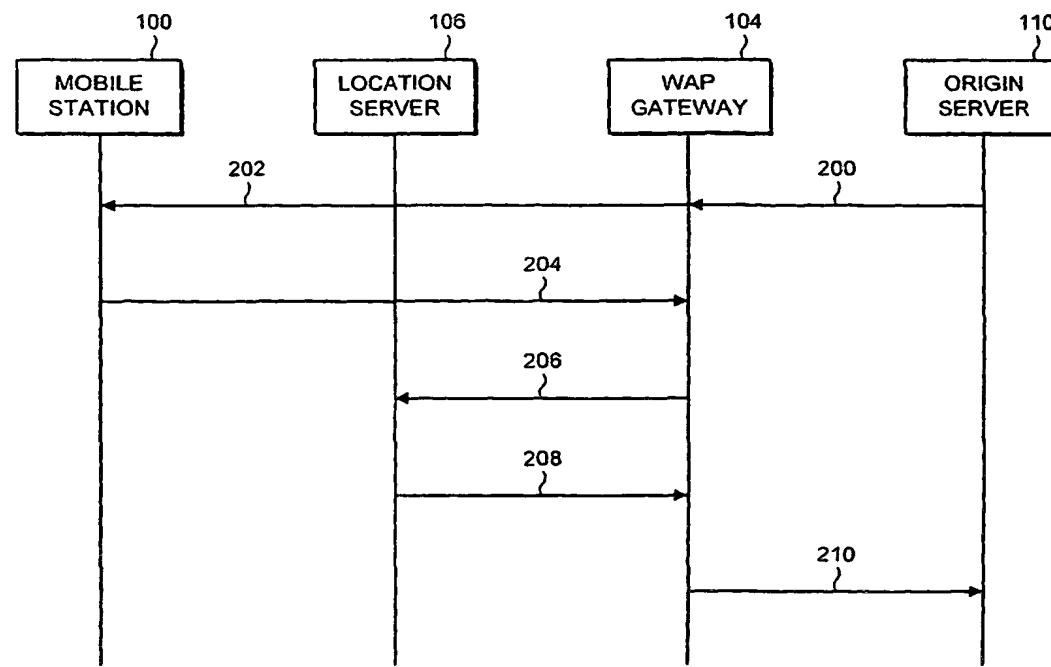
— with international search report

[Continued on next page]

(54) Title: POSITION LOCATION FOR WAP MOBILE ENTITY



WO 02/087194 A1



(57) Abstract: There is disclosed a method of identifying the location of a mobile entity supporting WAP functionality, comprising: transmitting a request for location information from an origin server to the mobile entity, receiving the location information from the mobile entity.



— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

5

POSITION LOCATION FOR WAP MOBILE ENTITYField of the Invention

The present invention relates to identifying the location of a mobile entity, and particularly but not exclusively to the identification of such location in a wireless application protocol (WAP) environment.

Background to the Invention

The advent of wireless application protocol (WAP) mobile entities, and particularly mobile telephones, has led to an increase in demand for internet-type services to be provided to mobile devices. Service operators and content providers offer internet type services to mobile telephone users utilizing WAP technology.

Such operators and content providers are particularly seeking to provide content information that is particularly suited to mobile device applications. For example, if a content provider is able to identify the current location of a mobile telephone, then the content provided to that mobile telephone can be modified as appropriate to reflect local information.

The aim of this invention is to provide an efficient technique for providing location information to a content provider.

Summary of the Invention

The present invention provides the content develop/server or origin server with a simple and easy to use interface to obtain location information from the handset utilising WAP functionality. No additional interfaces are needed in the case of a system utilising a WAP gateway and a location server.

In accordance with the present invention there is provided a method of utilising location based services in a mobile entity supporting mobile browsing functionality, comprising:

35 transmitting a request for location information from an origin

5 server to the mobile entity; collecting the location information at the mobile entity; receiving the location information from the mobile entity at the origin server; and transmitting location based information.

10 The method may further comprise the step of selecting enhanced services responsive to receiving the location information.

The location based information may comprise a location based service. The location based service may comprise content.

The mobile browsing functionality may comprise WAP functionality.

15 The request may be transmitted in a WMLScript.

The location information may comprise mobile network information.

The mobile network information may be converted into location information.

20 The mobile network information may be converted into location information utilising a mobile internet gateway and a location server.

25 The mobile entity may include GPS functionality. The GPS information may be enhanced into location information utilising a mobile internet gateway and a location server.

30 The present invention further provides a mobile communications system including a mobile entity supporting mobile browsing functionality and connected in a wireless network and a service provider connected to the Internet, wherein the mobile entity collects location information and provides such to the service provider responsive to a request therefrom.

The service provider may comprise a content provider.

5 The mobile communication system may further comprise means for selecting enhanced services responsive to receiving the location information

10 The mobile communications system may further include a mobile internet gateway, wherein the location information and the request therefore are transmitted via a mobile internet gateway.

The mobile communications system may further comprise a location server connected to the mobile internet gateway.

15 The mobile entity may have mobile network functionality, wherein the mobile entity provides mobile network information identifying its location, the mobile network information being received by the gateway, and converted into location information by the location server.

20 The location information may comprise longitude and latitude. The location information may be in format identifying place names.

25 The invention still further provides a mobile internet gateway having an interface to a wireless network supporting mobile browsing enabled mobile devices and an interface to the internet, wherein the gateway receives a request for location information of a mobile device connected in the wireless network, and forwards such to the mobile device, and receives location information from the mobile device.

30 The location information received may be in the form of mobile network information, wherein the gateway provides the mobile network information to a location server which returns location in a format suitable for transmission to a device connected to the internet.

The gateway may comprise a WAP gateway.

35 The format may be longitude and latitude.

5 The format may be place names.

The mobile entity may support GPS and the location information is provided directly from the mobile entity to a device connected to the internet.

10 The device connected to the internet may be a content provider.

Brief Description of the Drawings

The invention will now be described by way of reference to the accompanying drawings, in which:

15 Figure 1 illustrates elements of a network for implementation of an embodiment of the present invention; and

Figure 2 illustrates an exchange of messages in accordance with an embodiment of the invention.

Description of Preferred Embodiments

Referring to Figure 1, there is illustrated an exemplary scenario within which the invention is described herein. It should be noted however that the invention is not limited to such an exemplary scenario.

A mobile station 100, preferably a WAP enabled GSM mobile telephone, is connected to a wireless network 102, preferably a GSM network, via a wireless connection 112. The wireless network 102 is connected to a WAP gateway 104 via a connection 114. The WAP gateway is in turn also connected to the Internet 108 via a connection 116. An origin server 110, forming a content provider, connects to the internet 108 via a connection 120. The WAP Gateway 104 is further connected to a location sever 106.

All the elements of Figure 1 are known, and their function in so far as it relates to the invention is described in further details hereinbelow. The location server is a network entity

5 that performs the actual mapping between network information and location information.

Referring to Figure 2, the operation of the present invention will be described with reference to the example scenario. It should be noted that in the described example it is assumed
10 that the mobile station 100 is already connected to the origin server 110 in accordance with standard techniques, and makes a request for services from the origin server 110.

Responsive to the request for services, the origin server 110 sends a response to the mobile station. As represented by
15 arrow 200, a response message is sent from the origin server and intercepted by the WAP gateway 104. The WAP gateway 104 encodes the message into a suitable format, and forwards the response message to the mobile station 100 as represented by arrow 202. In accordance with the present invention, the
20 message sent to the mobile station by way of response includes a request for location information.

Responsive to receipt of the request for location information contained in the response message, the mobile station collects appropriate data. In the described example, of a GSM mobile
25 telephone, the mobile station collects appropriate GSM data. In alternative arrangements, such as where GPS functionality is provided, alternative data collection may be performed.

After collection of the location data, the mobile station sends a new request message as represented by arrow 204. The
30 new request message contains the collected location data in a pre-defined HTTP header.

The WAP gateway intercepts the message 204, which is destined for the origin server 110, based on the HTTP header. The WAP gateway 104 then issues a request message 206 to the location
35 server 106 over the connection 118, which is preferably an XML interface. The location server is requested to resolve the

5 location of the mobile station 100 based on the handset data collected by the mobile station and contained in the message 204.

Responsive thereto the location server 106 provides the WAP gateway 104 with the resolved location in a message 208. Where
10 the information provided by the mobile entity is GSM information, the resolved location is, for example, the longitude and latitude resolved from the GSM information. Alternatively GIS (Geographical Information System), such as the city and street may be resolved from the longitude and
15 latitude. This information may be resolved based on GSM network information such as Cell ID and Timing Advance. In an example where the collected data is GPS data, the location server may format the data for longitude and latitude, or the functionality of the WAP Gateway and the server may be
20 dispensed with.

Where the information collected by the mobile device is GSM data, the use of a WAP gateway to intercept the data and the location server to convert the information prior to forwarding the data to the origin server is essential. Where the
25 information collected by the mobile device is GPS data the use of the WAP gateway and the location server is not essential. However in such a case the use of the WAP gateway and the location server will enhance the information returned to the origin server.

30 The WAP gateway then provides the location information to the origin server 110 in a message as represented by arrow 210. The information is provided by substituting the headers of the message 204.

Once the origin server 110 is provided with the location
35 information identifying the position of the device, the origin

5 server can provide location specific content to the mobile entity.

The invention thus provides a new script function, which is a WMLS function, to transport the location of the WAP device to the content provider based on location information from either 10 a mobile network or a specific location system such as GPS. The technique is applicable not only to GSM or GPRS networks but also to the future development of TDMA and CDMA based mobile communications systems like UMTS and CDMA2000. The new 15 function may be known as the location information function, abbreviated to LocationInfo(). The format of the function may be as follows:

LocationInfo(URL, LL-format, PN-format)

Where:

URL: This is the URL that receives the location 20 information;

LL-format: This is the format and accuracy of the longitude/latitude (degrees, minutes etc); and

PN-format: This is the format for place names, for example country, zip code, street address etc.

25 In accordance with the present invention, the location information function, usable by any content provider, obtains the position of a mobile device through a gateway.

In the example of Figures 1 and 2, the WAP gateway 104 is preferably a Nokia Artuse WAP Gateway, and the location server 30 106 is preferably a Nokia Artuse Location Server.

5 CLAIMS:

1. A method of utilising location based services in a mobile entity supporting mobile browsing functionality, comprising: transmitting a request for location information from an origin server to the mobile entity; collecting the location information at the mobile entity; receiving the location information from the mobile entity at the origin server; and transmitting location based information.
- 10 2. The method of claim 1 further comprising the step of selecting enhanced services responsive to receiving the location information.
- 15 3. The method of claim 1 or claim 2 wherein the location based information comprises a location based service.
4. The method of any one of claims 1 to 3 wherein the location based service comprises content.
- 20 5. The method of any one of claims 1 to 4 wherein the mobile browsing functionality comprises WAP functionality.
6. The method of any one of claims 1 to 5 wherein the request is transmitted in a WMLScript.
- 25 7. The method of any one of claims 1 to 6 wherein the location information comprises mobile network information.
8. The method of claim 7 wherein the mobile network information is converted into location information.
- 20 9. The method of claim 8 wherein the mobile network information is converted into location information utilising a mobile internet gateway and a location server.
- 30 10. The method of any one of claims 1 to 6 wherein the mobile entity includes GPS functionality.

5 11. The method of claim 10 wherein the GPS information is
enhanced into location information utilising a mobile internet
gateway and a location server.

10 12. A mobile communications system including a mobile entity
supporting mobile browsing functionality and connected in a
wireless network and a service provider connected to the
Internet, wherein the mobile entity collects location
information and provides such to the service provider
responsive to a request therefrom.

15 13. A mobile communications systems of claim 12, wherein the
service provider comprises a content provider.

14. The mobile communication system according to any of
claims 12 to 13 further comprising means for selecting
enhanced services responsive to receiving the location
information

20 15. The mobile communications system of any one of claims 12
to 14 wherein the system further includes a mobile internet
gateway, wherein the location information and the request
therefore are transmitted via a mobile internet gateway.

25 16. The mobile communications system of claim 15 wherein the
system further comprises a location server connected to the
mobile internet gateway.

30 17. The mobile communication system of any one of claims 12
to 16 in which the mobile entity has mobile network
functionality, wherein the mobile entity provides mobile
network information identifying its location, the mobile
network information being received by the gateway, and
converted into location information by the location server.

18. The mobile communication system of claim 17 wherein the
location information comprises longitude and latitude.

5 19. The mobile communication system of claim 17 wherein the
location information is in format identifying place names.

10 20. A mobile internet gateway having an interface to a
wireless network supporting mobile browsing enabled mobile
devices and an interface to the internet, wherein the gateway
receives a request for location information of a mobile device
connected in the wireless network, and forwards such to the
mobile device, and receives location information from the
mobile device.

15 21. The mobile internet gateway of claim 20 in the location
information received is in the form of mobile network
information, wherein the gateway provides the mobile network
information to a location server which returns location in a
format suitable for transmission to a device connected to the
internet.

20 22. The mobile internet gateway according to claims 20 or 21,
wherein the gateway comprises a WAP gateway.

25 23. The mobile internet gateway of claims 21 or 22 wherein the
format is longitude and latitude.

25 24. The gateway of claims 21 or 22 wherein the format is
place names.

25 25. The gateway of claim 21 or 22 in which the mobile entity
supports GPS and the location information is provided directly
from the mobile entity to a device connected to the internet.

30 26. The gateway of any one of claims 21 to 25 wherein the
device connected to the internet is a content provider.

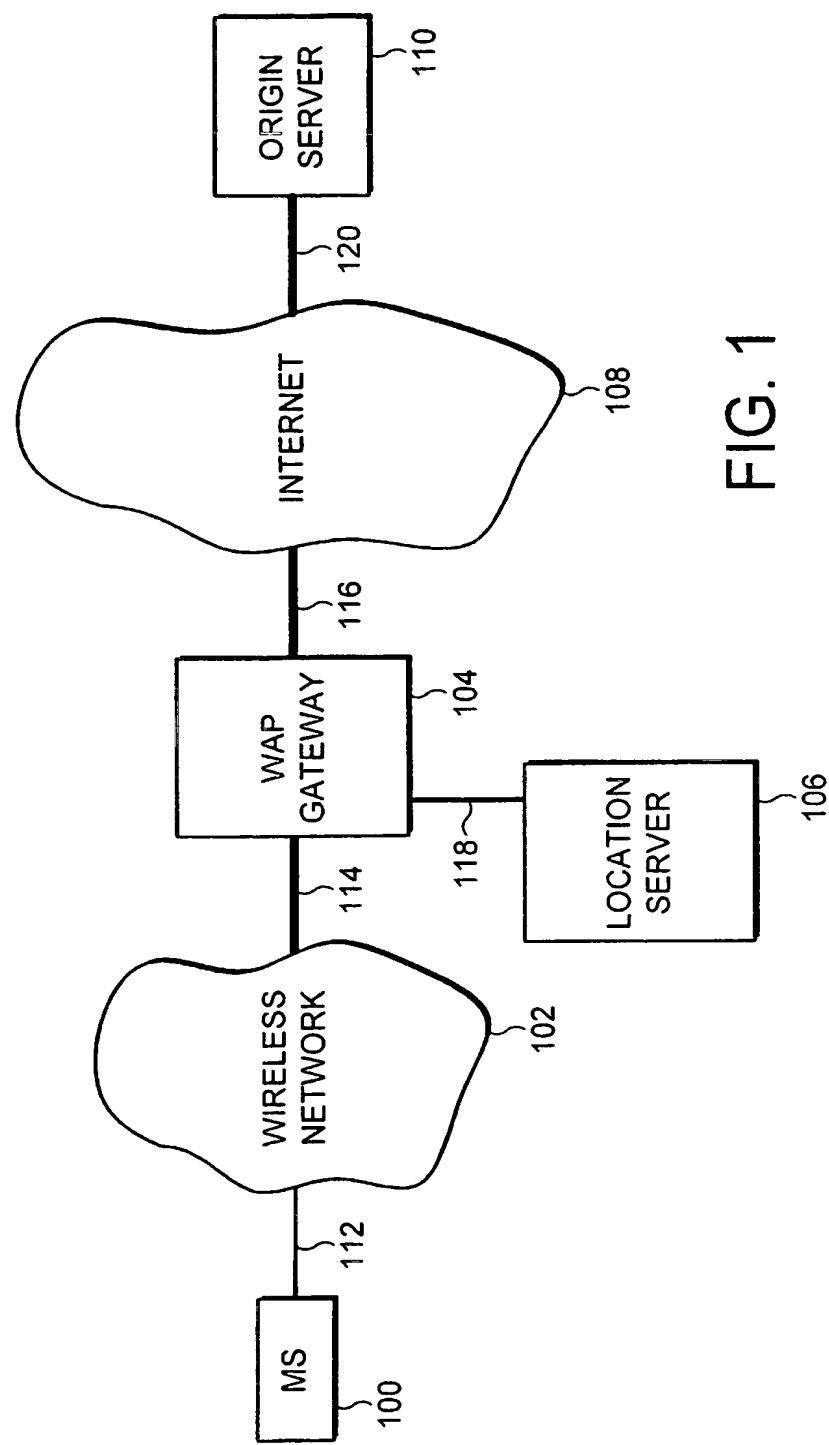


FIG. 1

2 / 2

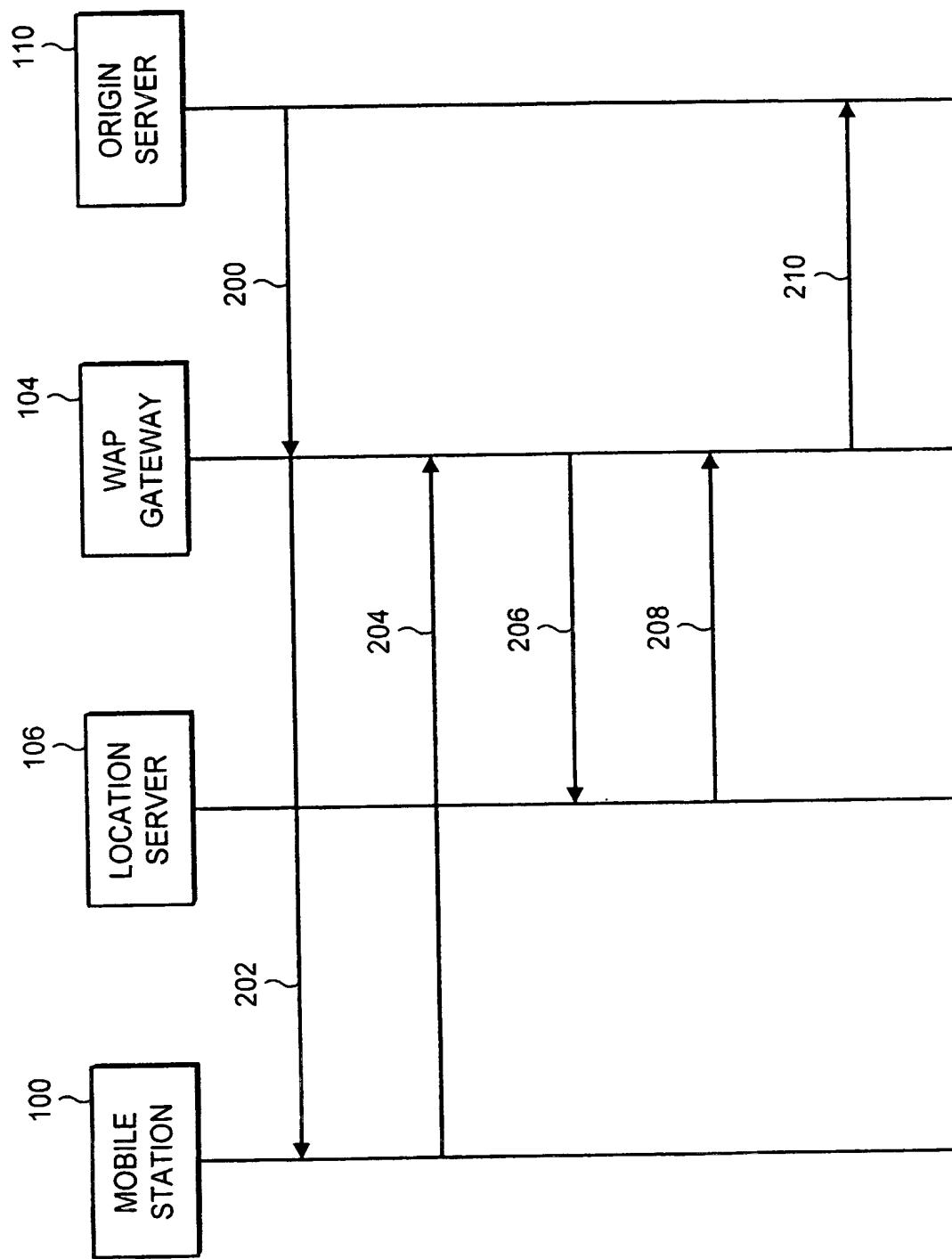


FIG. 2

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 02/02172

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H04L29/08 G06F17/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbol)

IPC 7 H04L G06F H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 19102 A (HOYLER STEFAN ;ZILLIKENS FRANK (DE); NOKIA MOBILE PHONES LTD (FI)) 15 March 2001 (2001-03-15) page 4, line 24 -page 4, line 28 page 21, line 20 -page 21, line 23 page 22, line 27 -page 23, line 27 page 26, line 14 -page 31, line 15 page 31, line 22 -page 32, line 14; figures 4,5A,5B,6 ---	1-7, 10-16, 20,22 19,24,25
Y	FR 2 799 594 A (CIT ALCATEL) 13 April 2001 (2001-04-13) page 3, line 20 -page 3, line 22 page 4, line 20 -page 5, line 10 page 6, line 5 -page 7, line 22 page 8, line 22 -page 9, line 20; figure 1 ---	1,7-9, 12,17, 18,20, 21,23,26 19,24,25
X		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

6 September 2002

16/09/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Olmos, J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 02/02172

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 946 615 A (LEUCA ILEANA A ET AL) 31 August 1999 (1999-08-31) column 4, line 44 -column 4, line 59 column 5, line 45 -column 5, line 65; figures 1,3B,4B -----	19,24

INTERNATIONAL SEARCH REPORT

Int'l Application No
PCT/IB 02/02172

Patent document cited in search report	Publication date		Patent family member(s)		Publication date
WO 0119102	A 15-03-2001		AU 6842000 A BR 0013748 A WO 0119102 A1 EP 1214852 A1 GB 2353919 A		10-04-2001 21-05-2002 15-03-2001 19-06-2002 07-03-2001
FR 2799594	A 13-04-2001		FR 2799594 A1 EP 1102445 A1		13-04-2001 23-05-2001
US 5946615	A 31-08-1999		TW 469726 B WO 9816076 A1		21-12-2001 16-04-1998